Institute of Natural Resource Sustainability
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ILLINOIS STATE GEOLOGICAL SURVEY
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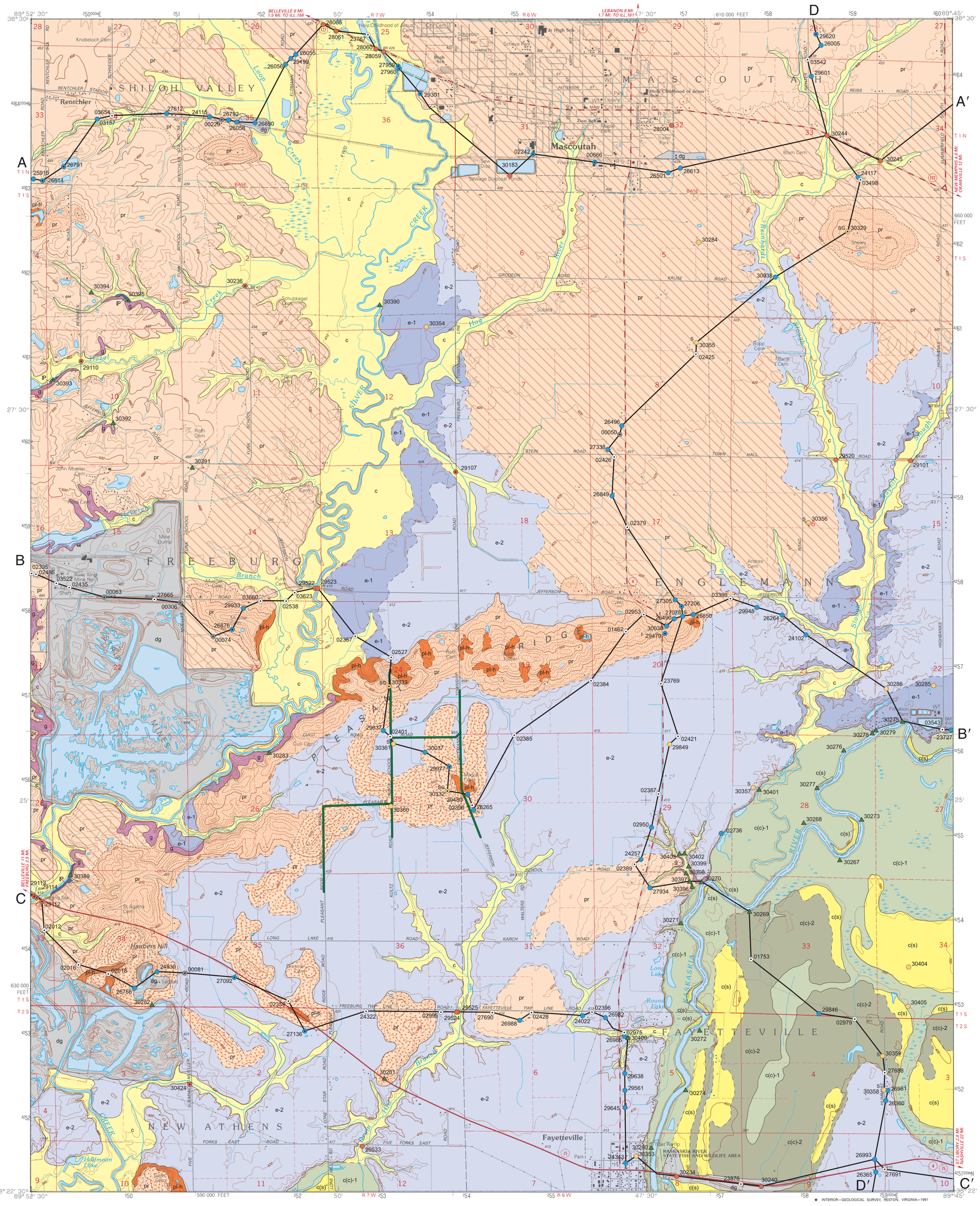
SURFICIAL GEOLOGY OF MASCOUTAH QUADRANGLE
ST. CLAIR COUNTY, ILLINOIS

David A. Grimley
2010

Illinois Geologic Quadrangle Map
IGQ Mascoutah-SG Revision



QUATERNARY DEPOSITS

Description	Unit	Interpretation
HUDSON EPISODE (~12,000 years before present (B.P.) to today)		
Fill or removed earth; sediment of various types; up to 50 feet thick	Disturbed ground: dg	**Artificial fill or excavations;** includes large areas of disturbed sediment and borrow areas from surface mining
Silty clay loam, silty clay, silt loam, and loam; occasional sand and gravel beds; dark brown to gray; massive to well-stratified; noncalcareous; up to 15 feet thick	Cahokia Formation: c	**Alluvium** (river deposits) in stream valley floodplains (other than Kaskaskia Valley); derived from reworking and sorting of loess, diamicton, and sand and gravel exposed in uplands and slopes; includes some historical deposition
Silt loam, silty clay loam, and silty clay; olive-gray to grayish brown; faintly to prominently stratified; noncalcareous; up to 15 feet thick; contains weakly developed modern soils	Cahokia Formation (clayey facies): c(c)-1	**Abandoned channel fills, backswamp and overbank alluvium;** differentiated only in modern floodplain of Kaskaskia River
Fine to medium sand; may include beds of silt, silty clay, and sandy loam; yellowish brown to olive-brown; moderately to well sorted; stratified; noncalcareous; up to 20 feet thick	Cahokia Formation (sandy facies): c(s)	**Point bar and channel deposits;** in modern Kaskaskia floodplain as well as in early to middle Holocene terraces; differentiated only in Kaskaskia Valley; interstratified with c(c)-1 and c(c)-2
Silt loam, silty clay loam, and silty clay; dark brown to grayish brown; weakly stratified; may include beds of fine sand near base; noncalcareous; up to 20 feet thick; includes modern soil profile in upper 5 to 7 feet	Cahokia Formation (clayey facies - high level): c(c)-2	**Overbank alluvial deposits;** within early to mid Holocene terrace; differentiated only in Kaskaskia Valley; underlain by Equality or Henry Formation
WISCONSIN EPISODE (~75,000–12,000 years B.P.)		
Silty clay loam to silty clay; grayish brown to brown; faintly stratified at depth; leached; up to 15 feet thick	Equality Formation (low terrace): e-1	**Lake deposits and/or overbank alluvium;** likely deposited as slackwater sediment during late last glacial aggradation of the Mississippi River; terraces occur at ~400 to 412 feet asl; includes <1 foot loess cover; underlain by Henry or Pearl Formation
Silt loam to silty clay loam; light olive-brown to yellowish brown to slightly reddish brown; mainly calcareous; may include interbeds of cross-bedded fine sand; stratified; up to 30 feet thick	Equality Formation (high terrace): e-2	**Lake deposits and/or overbank alluvium;** likely deposited as slackwater sediment during peak glacial aggradation of the Mississippi River; terraces occur at ~408 to 420 feet asl; includes ~3 feet loess cover; underlain by Henry or Pearl Formation
Fine to medium sand; tan to grayish brown; stratified; moderately to well sorted; mainly calcareous; may include interbeds of calcareous silt loam; up to 35 feet thick	Henry Formation (cross sections only): h	**Outwash (glacial meltwater river deposits);** likely deposited as a result of glaciation to the northeast; possibly deposited postglacially by the Kaskaskia River; underlain by coarser Pearl Formation; overlain by finer Equality or Cahokia Formations
Silt to silt loam; yellowish brown to gray to brown; massive to blocky structure; friable; noncalcareous; contains modern soil solum in upper 3 to 5 feet; up to 15 feet thick	Peoria and Roxana Silts (>5 feet thick): pr	**Loess (windblown silt);** includes some redeposited loess in sloping areas; contains modern soil; stippled or hachured areas are underlain by Pearl Formation; mapped where >5 feet thick
SANGAMON EPISODE (~130,000–75,000 years B.P.)		
Clay loam to sandy clay loam to silty clay loam; olive to olive-gray to yellow-brown; typically contains color mottling, iron staining and clay skins; noncalcareous; up to 20 feet thick	Berry Clay Member, Pearl Formation (cross sections only): pl-bc	**Accretionary and strongly weathered sediment;** includes lake sediment and alluvium deposited and weathered during the Sangamon interglacial; can include weathered Pearl Formation mixed with younger loess and redeposited loess
ILLINOIS EPISODE (~200,000–130,000 years B.P.)		
Intermixed sand, gravel, loam, and diamicton; reddish brown to yellowish brown to light olive-gray; some deposits are mixed sand and diamicton; (smaller stipples on map where buried); other deposits are predominantly sand (larger stipples on map where buried); upper 10 to 15 feet is often more weathered; soft to moderately stiff; fractured and faulted in places with inclusions of silty clay; noncalcareous to calcareous; up to 115 feet thick	Hagarstown Member, Pearl Formation: pl-h; (mixed diamicton and sand facies; where buried by >5′ loess); (sandy facies where buried by >5 feet loess)	**Ice-contact sediment;** upper portion contains Sangamon Geosol weathering; contains debris flows, inclusions of older paleosols and deposits; well-sorted sand from subglacial or ice-marginal channels; intertongues with the Pearl Formation in lowlands; covered by 0 to 5 feet of loess at surface
Sand with some gravel; predominantly fine to medium sand in central and northern areas; may include silty beds; gray to yellowish brown; stratified; moderately to well sorted; up to 55 feet thick	Pearl Formation (outwash facies) (cross sections only): pl(o); (areas where buried)	**Outwash (glacial meltwater deposits);** occurs underneath Berry Clay Member (diagonal line pattern shown on loess-covered Illinois Episode terraces on map, typically at depths of 20–25 feet); also occurs widely underneath Equality Formation; deposited in ancestral Silver Creek and Kaskaskia River valleys
Pebbly loam diamicton, with sand and gravel bodies (up to 45 feet thick); light olive-brown to dark gray; diamicton is generally massive, very stiff to hard, calcareous, and contains typically <2-inch-diameter pebbles; upper few feet may be weathered to brown or yellowish brown; up to 80 feet thick	Glasford Formation: g	**Till and ice-marginal sediment;** upper few feet of diamicton may contain Sangamon Geosol solum; may include sand and gravel lenses and supraglacial deposits; lower portion is mainly basal till; crops out along steep slopes in western areas; covered by 0 to 5 feet of loess at surface
PRE-ILLINOIS EPISODE (~700,000–400,000 years B.P.)		
Pebbly silty clay loam to loam diamicton, with sand and gravel bodies (up to 30 feet thick); light olive-brown to dark olive-gray to dark gray; massive to weakly laminated; moderately stiff to stiff; noncalcareous to calcareous; up to 55 feet thick	Banner Formation undifferentiated (cross sections only): b	**Till and ice-marginal sediment;** may contain evidence of Yarmouth Geosol weathering or oxidation in upper 10 feet; the alteration zone may be truncated by younger units
Silty clay loam to silty clay to silt loam to fine sand; olive-gray to greenish gray to light olive-brown to strong brown; weakly laminated; noncalcareous to weakly calcareous; up to 35 feet thick; may include up to 15 feet of sand	Canteen member, Banner Formation (cross sections only): b-c	**Alluvium, colluvium, and residuum;** preglacial; immediately underlain by bedrock; may contain one or more paleosols; may include soft, highly weathered shale near base

PRE-QUATERNARY DEPOSITS

Description	Unit	Interpretation
Shale, limestone, sandstone, coal, and underclay; ranges from gray to dark gray to yellowish brown to black; laminated to bedded to massive; may contain marine fossils; noncalcareous to calcareous	Pennsylvanian bedrock: P	**Bedrock** or near-surface bedrock (within 5 feet of land surface); shallow marine, deltaic, and terrestrial sequences; crops out in western portions of quadrangle along Silver Creek and tributaries to Hazel Creek

Base map compiled by Illinois State Geological Survey from digital data provided by the United States Geological Survey. Topography by photogrammetric methods from aerial photographs taken 1968. Field checked 1988. Map edited 1990. Supersedes Army Map Service map dated 1954.

North American Datum of 1927 (NAD 27)
Projection: Transverse Mercator
10,000-foot ticks: Illinois State Plane Coordinate system, west zone (Transverse Mercator)
1,000-meter ticks: Universal Transverse Mercator grid system, zone 16

Recommended citation:
Grimley, D.A., 2010, Surficial Geology of Mascoutah Quadrangle, St. Clair County, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Mascoutah-SG Revision, 2 sheets, 1:24,000; report, 9 p.

SCALE 1:24,000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology based on field work by David A. Grimley, 2006.

Digital cartography by Jennifer E. Carrell, Zahra Golshani, Matt Turino, and Jane E.J. Domier, Illinois State Geological Survey.

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The Illinois State Geological Survey, the Illinois Department of Natural Resources, and the State of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this document and accept no liability for the consequences of decisions made by others on the basis of the information presented here. The geologic interpretations are based on data that may vary with respect to accuracy of geographic location, the type and quantity of data available at each location, and the scientific and technical qualifications of the data sources. Maps or cross sections in this document are not meant to be enlarged.

Data Type
- Outcrop
- Stratigraphic boring
- Water well boring
- Engineering boring
- Coal boring
- Other boring, including oil and gas

Unit Contact Type
- Accuracy generally <200 feet
- Accuracy generally >200 feet
- Subsurface contact (depth >5 feet)
- A—A′ Line of cross section
- Electrical resistivity transect

SG 26211 Labels indicate samples (s) or geophysical log (G). Boring and outcrop labels indicate the county number. Dot indicates boring is to bedrock.

Note: The county number is a portion of the 12-digit API number on file at the ISGS Geological Records Unit. Most well and boring records are available online from the ISGS Web site.

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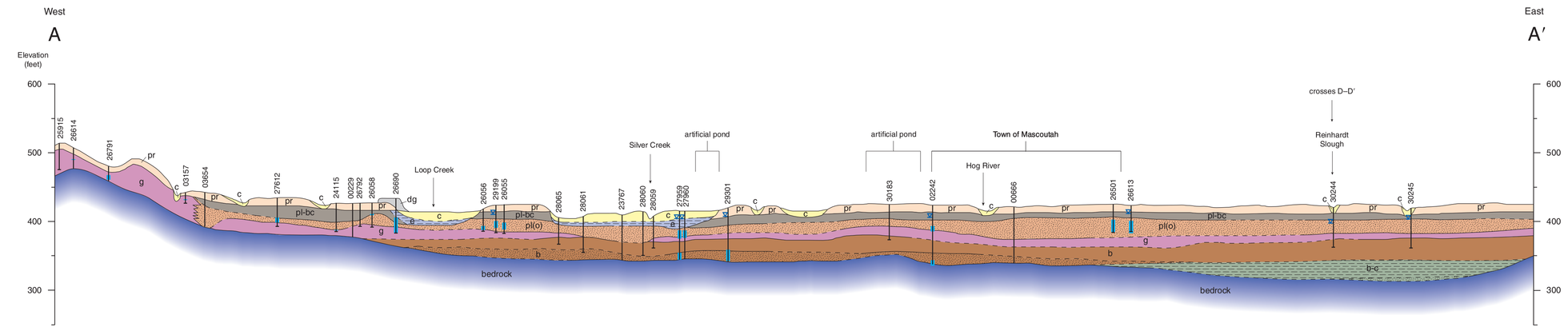
1	2	3
4		5
6	7	8

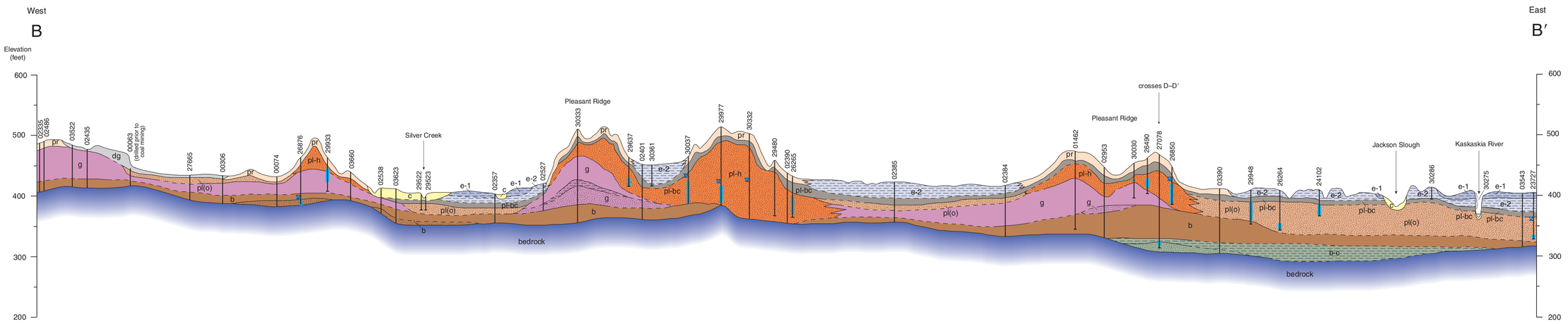
ADJOINING QUADRANGLES
1 O'Fallon
2 Lebanon
3 Trenton
4 Freeburg
5 Venedy
6 New Athens West
7 New Athens East
8 Saint Libory

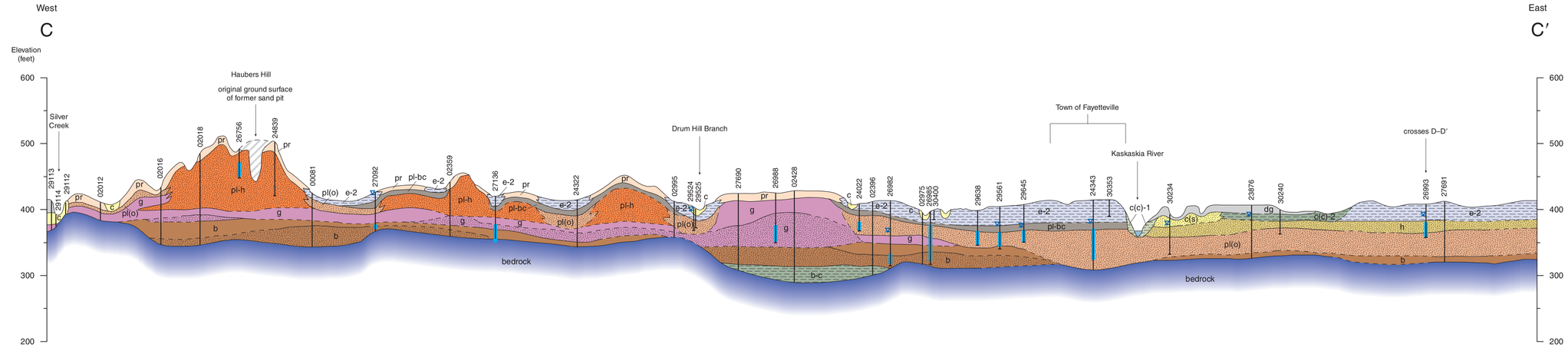
1½° TRUE NORTH MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 2010

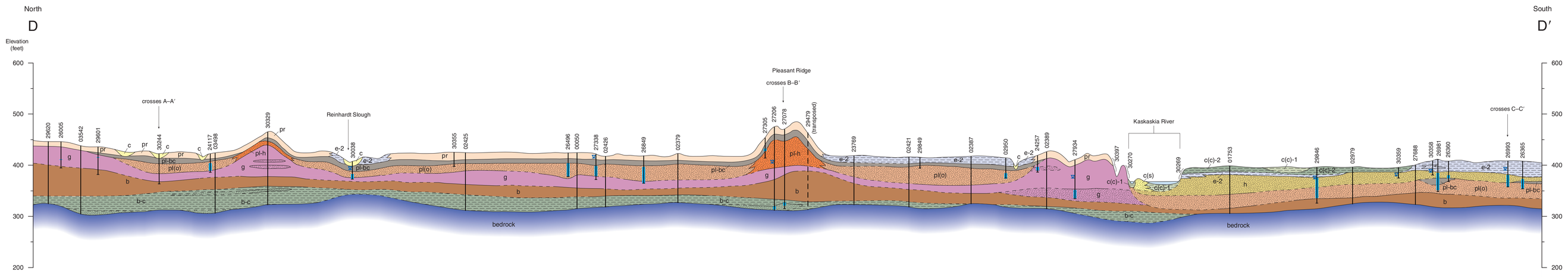
ROAD CLASSIFICATION
- Primary highway, hard surface
- Secondary highway, hard surface
- Light-duty road, hard or improved surface
- Unimproved road
- State Route

IGQ Mascoutah-SG Revision Sheet 2 of 2









Cross Sections

- Sand; may contain some gravel or silt
- Laminated silt and clay
- Diamicton, massive silt, or other fine-grained sediment
- Contact
- Inferred contact
- Static water level (reported for engineering borings and some stratigraphic and water-well borings; adjacent wells may have been measured during various seasons and years)
- Water-yielding intervals (as reported by drillers for some water-well records)

Horizontal scale: 1 inch = 2,000 feet
Vertical scale: 1 inch = 100 feet
Vertical exaggeration: 20×

dg	Disturbed ground	c(c)-1	Cahokia Formation (clayey facies)	c(c)-2	Cahokia Formation (clayey facies - high level)	e-2	Equality Formation high terrace	pr	Peoria and Roxana Silts
c	Cahokia Formation (tributaries)	c(s)	Cahokia Formation (sandy facies)	e-1	Equality Formation low terrace	h	Henry Formation	pl-bc	Berry Clay Member, Pearl Formation
pl-h	Hagarstown Member, Pearl Formation	g	Glasford Formation	b-c	Canteen member, Banner Formation	pl(o)	Pearl Formation (outwash facies)	b	Banner Formation undifferentiated
								IP	Pennsylvanian bedrock